Claims

[c1]   What is claimed is:

1.A wire feeder for a GMAW welding system, the wire feeder comprising:

a power input configured to receive power at a substantially constant current level from a power source;

a drive assembly configured to introduce a consumable electrode to a weld at a wire feed speed; and

a controller to set an initial wire feed speed based on a user input and automatically adjust the wire feed speed to non-incrementally reduce a difference between a target arc voltage and an actual arc voltage.

[c2]   2.The wire feeder of claim 1 wherein the controller is further configured to compare the actual arc voltage to the target arc voltage, set by a user, and, from the comparison, non-incrementally adjust the wire feed speed based on a wire feed speed gain setting determined from the initial wire feed speed.

[c3]   3.The wire feeder of claim 2 wherein the controller is further configured to decrease the wire feed speed if the actual arc voltage is less than the target arc voltage.

[c4]   4.The wire feeder of claim 2 wherein the controller is further configured to increase the wire feed speed if the target arc voltage is less than the actual arc voltage.

[c5]   5.The wire feeder of claim 2 wherein the controller is further configured to adjust wire feed speed at a first gain rate for a first initial wire feed speed and at a second gain rate for a second initial wire feed speed, and wherein the first gain rate is less than the second gain rate if the first initial wire feed speed is greater than the second initial wire feed speed.

[c6]   6.The wire feeder of claim 1 further comprising a control panel configured to allow a user to select the initial wire feed speed and a scaled target arc voltage.

[c7]   7.A GMAW welding system comprising:
a power source configured to provide a constant current output; and
a wire feeder connected to receive the constant current output and configured to deliver a consumable electrode to a weld at an initial wire feed speed and automatically adjust the wire feed speed at a gain rate that varies with the initial wire feed speed to maintain a target voltage at the weld.

[c8]   8.The GMAW welding system of claim 7 wherein the wire

feeder includes a menu designed to enable a user to input a desired target voltage and the initial wire feed speed and further includes a controller designed to read the inputs.

[c9] 9.The GMAW welding system of claim 7 wherein the wire feeder includes a controller configured to compare an actual voltage at the weld to the target voltage and adjust the wire feed speed at the gain rate to non-sequentially minimize a difference between the actual voltage and the target voltage.

[c10] 10.The GMAW welding system of claim 9 wherein the controller of the wire feeder is further configured to increase the wire feed speed if the actual voltage exceeds the target voltage.

[c11] 11.The GMAW welding system of claim 10 wherein the controller of the wire feeder is further configured to decrease the wire feed speed if the target voltage exceeds the actual voltage.

[c12] 12.The GMAW welding system of claim 7 wherein the wire feeder includes a voltage sensed wire feeder designed to at least operate based on voltage feedback from the weld.

[c13] 13.A controller to regulate output of a wire feeder, the

controller programmed to:

set an initial wire feed speed and a target arc voltage for a constant current (CC) welding process;

set a rate of adjustment from the initial wire feed speed;

monitor a voltage level at a weld during the CC welding process; and

adjust wire feed speed at the rate of adjustment if the voltage level at the weld deviates from the target arc voltage.

[c14]   14. The controller of claim 13 further programmed to increase the wire feed speed at the rate of adjustment if the voltage level at the weld is greater than the target arc voltage and decrease the wire feed speed at the rate of adjustment if the voltage level at the weld is less than the target arc voltage.

[c15]   15. The controller of claim 13 further programmed to receive a number of inputs from a user, and set the initial wire feed speed, the target arc voltage, and the rate of adjustment from the number of inputs.

[c16]   16. The controller of claim 13 incorporated into a portable wire feeder configured to introduce consumable welding wire to the weld.

[c17]   17. The controller of claim 16 wherein the wire feeder in-

cludes a drive assembly configured to introduce the consumable wire to the weld at a variable wire feed speed.

[c18]   18. The controller of claim 16 wherein the portable wire feeder is further configured to receive a CC power input from a power source.

[c19]   19. A method of executing a constant current welding process, the method comprising the steps of:
receiving voltage feedback of voltage at a weld;
comparing a value of actual voltage at the weld to a target voltage; and
adjusting a speed by which consumable welding wire is delivered to the weld at a rate that varies with initial wire feed speed to reduce a difference between the actual voltage and the target voltage.

[c20]   20. The method of claim 19 wherein the step of adjusting includes the steps of:
increasing the speed if the actual voltage exceeds the target voltage; or
decreasing the speed if the target voltage exceeds the actual voltage.

[c21]   21. The method of claim 19 wherein the step of adjusting includes adjusting wire feed speed at a first gain rate for a first initial wire feed speed and at a second gain rate

for a second initial wire feed speed, and wherein the first gain rate is less than the second gain rate if the first initial wire feed speed is greater than the second initial wire feed speed.